Work Order ID 67434

Monday, March 21, 2011 9:44:53 AM

Item ID: D412-664-203 **Accept** **Setup Start** **Stop**

Revision ID:

Item Name: Crosstube Aft

Start Date: 3/21/2011 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 3/25/2011 **Req'd Qty:** 1.00 **Customer:**

Reference:

Approvals: **Process Plan:** [illegible] **Date:** 11-03-21 **Tooling:** _____ **Date:** _____ **Run Start** **Stop**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	**Revision Nbr**								
D412-664-243	E								
100	DOCUMENT CONTROL	0.00							
DC	**Memo**	0.00							
Document Control	Photocopy bluefile and create labels as per PPP D412-664-203 CHG 006								
110	Packaging	0.00							
Packaging	**Memo**	0.00							
Packaging									
120	BENDING MACHINE - CROSSTUBES	0.00							
CNC Bend 2	**Memo**	0.00							
CNC Alpha 160 Bender	Bend tube as per Dwg D412-664-243 using CNC bender program 412-aft and Folio FT010								

for BG 11-4-4

11-3-28

11-3-28

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

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Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start** **Stop**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	QC15- Crosstube Dimensional Check	0.00							
QC	**Memo**	0.00							
Quality Control									
140		0.00							
Crosstubes	Crosstubes								
Crosstubes	**Memo**	0.00							

1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551and drill table DT8577 using #9 holes as per QSI 10 to install towers.

2-Ream hole to finish size in tube as per Dwg D412-664-243using drill Jig DT8550 & DT8551.Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-SCRIBE PART # & BATCH #

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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NOTE: Date & initial all entries

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Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start** **Stop**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150	Crosstubes Chemical Conversion	0.00							
HandFXtube	**Memo**	0.00 SAD	11-03-29			1			
Hand Finishing Crosstubes									
160	QC3- Inspect Part Finish	0.00							
QC	**Memo**	0.00 SWL03/31							
Quality Control									
170	QC5- Inspect part completeness to step on W/O	0.00							
QC	**Memo**	0.00 SWL03/31							
Quality Control									

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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NOTE: Date & initial all entries

Work Order ID 67434

Monday, March 21, 2011 9:44:53 AM

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Run Start

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Stop

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180	Outsource process - NDT per QSI038 4.1	0.00							
Outsource2	**Memo**	0.00							
Outsource process - NDT	Liquid Penetrant Inspection as per QSI 038Or Issue P/O: 1343 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								
190	Packaging	0.00							
Packaging	**Memo**	0.00							
Packaging	Inspect for transit damage Ensure copy of NDT results attached to work order.								
200	QC5- Inspect part completeness to step on W/O	0.00							
QC	**Memo**	0.00							
Quality Control	Inspect for damage & ensure results are as per Dwg D412-664-203								

11-03-30

1

11/3/30 1

AT 11-03-30

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

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Item Name: Crosstube Aft

Start Date: 3/21/2011 **Start Qty:** 1.00 **Cust Item ID:**

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Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start** **Stop**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	SprayPaint	0.00							
SprayPaint						JT	11-03-30		
Spray Painting	**Memo**	0.00							
	1-Prime inside and outside crosstube as per QSI 005 4.2 2-Paint outside crosstube with White Imron as per QSI 005 4.2 PRIME: Start Time: 10 00 Fininsh Time: 11 00 PAINT: Start Time: 3 00 Finish Time: 4 00								
220	QC14- Inspect Spray Paint	0.00							
QC						ml	11	03	31 (1)
Quality Control	**Memo**	0.00							
	Then,Wrap in plastic bag to protect from scratches								

Dart Aerospace Ltd

W/O: 67434

WORK ORDER CHANGES

DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
11-03-31	210	grind off paint on inside of tube 2" wide staying 2" away from cuffs. Re alodine ground area. Prime ground area using tempo yellow epoxy primer	BT	11-03-31		MD 11/04/01	
		Inspect		11-04-01			
		scuff + clean coat using imron 5005	BT	11-04-01		MD 11/04/01	

Part No: D412-664-203 **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

WORK ORDER NON-CONFORMANCE (NCR)

NCR:

DATE	STEP	Description of NC Section A	Corrective Action Section B: Initial Chief Eng	Corrective Action Section B: Action Description Chief Eng	Corrective Action Section B: Sign & Date	Verification Section C	Approval Chief Eng	Approval QC Inspector

NOTE: Date & initial all entries

Work Order ID 67434

Monday, March 21, 2011 9:44:53 AM

Item ID: D412-664-203 **Accept** **Setup Start** **Stop**

Revision ID:

Item Name: Crosstube Aft

Start Date: 3/21/2011 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 3/25/2011 **Req'd Qty:** 1.00 **Customer:**

Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start** **Stop**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230		0.00							
Crosstubes	Crosstubes					4	11	04	02 (1)
Crosstubes	**Memo**	0.00							
Crosstubes	Assemble as per Dwg D412-664-203 1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe 2-Install supports with magnobond as per QSI 015. Adhere for for 12 Hrs A/R 6398 Magnobond Batch: 116677 Expiry Date: 08/2011 3-Install clamps as per Dwg D212-664-203 using installaition jig DT9024 with 0.010 thick brass shims on both chafing sheild (D3189-1). Torque clamps to 80-100 in lb.								
240	QC5- Inspect part completeness to step on W/O	0.00							
QC	**Memo**	0.00							
Quality Control	Re measure by flipping tube and support A is centr.								

8/10/04

8/10/04

Dart Aerospace Ltd

W/O: 67434

WORK ORDER CHANGES

DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
11-04-02	230	install chafing shields using Pro Seal P/S 890 B-2 as per attached email	JT	11-04-02		11/04/4	

Part No: D412-664-203 **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

WORK ORDER NON-CONFORMANCE (NCR)

NCR:

DATE	STEP	Description of NC Section A	Corrective Action Section B: Initial Chief Eng	Action Description Chief Eng	Sign & Date	Verification Section C	Approval Chief Eng	Approval QC Inspector
	230	Found that the center ~~Approx~~ is .100" - .125" off center to one side. Rt moves During Positin						

NOTE: Date & initial all entries

Work Order ID 67434

Monday, March 21, 2011 9:44:53 AM

Item ID: D412-664-203 **Accept** **Setup Start**

Revision ID: **Stop**

Item Name: Crosstube Aft

Start Date: 3/21/2011 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 3/25/2011 **Req'd Qty:** 1.00 **Customer:**

Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop**

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
250 Packaging Packaging	Pick Kit	0.00				11/4/11			
	Memo	0.00							
260 QC Quality Control	QC4- 100% Inspect kits for completeness	0.00							
	Memo	0.00 Sul 04/04							
270 Packaging Packaging	Packaging	0.00				11/4/11			
	Memo	0.00							

Identify and pack for shipping as per PPP D412-664-203
******Ensure tube is not packaged if curing time is less than 12 hrs, see step 27 for application time & date *******
Time & date of packaging: 11
Location: 103

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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NOTE: Date & initial all entries

Work Order ID 67434

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Reference:

Run Start

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Stop

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
280	QC21- Final Inspection - Work Order Release	0.00					11/4/11		
QC	**Memo**	0.00							
Quality Control									

MF
11-04-09

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Picklist Print

Monday, March 21, 2011 9:45:00 AM

Work Order ID: 67434

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 3/21/2011 **Required Date:** 3/25/2011

Start Qty: 1.00 **Required Qty:** 1.00

Comments: IPP Rev:E□04.02.16□Reformat; Added D3189-1□K/DS
IPP Rev:F 06-03-29 Remove Coments on Pick List JLM□
IPP Rev:G 06.12.08 per ECN 886 EC
IPP Rev:H 07-04-30 As per Rev D JLM
IPP Rev:I 08-06-12 add comment in seq. 21 DD verified by:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D412-664-203TRN		Manufactured	No	B67457		110	Each	0.0000	1	1			
Crosstube Turning Detail													
D2856-600		Manufactured	No			230	f	125.9531	1.76	1.76			
Abrasion Strip													

Location	Loc Qty	Loc Code
ST409	125.9531	
25656	1.25	
26650	2.5	
37668	122.2031	

D2896-1		Manufactured	No			230	Each	13.0000	1	1			
Support													

Location	Loc Qty	Loc Code
LG052	13	
47820	5	
58356	8	

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

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Picklist Print

Monday, March 21, 2011 9:45:00 AM

Work Order ID: 67434

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 3/21/2011 **Required Date:** 3/25/2011

Start Qty: 1.00 **Required Qty:** 1.00

D3189-1 Manufactured No 230 Each 26.0000 2 2

Chafing Shield B67587 67587 ET 11-04-02

Pro Seal # M116544 exp: 04/2011 MM

Location	Loc Qty	Loc Code	
FG	2		
36065	2		
LG053	24		
58960	4		
63982	20		

D3595-063-570 Manufactured No 230 Each 54.0000 2 2

RUBBER CUSHION ET 11-04-02

Location	Loc Qty	Loc Code	
FG	4		
37971	4		
LG055	50		
42243	29		x2
63406	21		

MS21920-28 Purchased No 230 Each 86.0000 4 4

Clamp(per MIL-DTL-8783C) ET 11-04-02

Location	Loc Qty	Loc Code	
FG	5		
105884	5		
LG050	75		
116039	24		x3
116839	51		all
LG051	6		
114749	6		

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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NOTE: Date & initial all entries

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Monday, March 21, 2011 9:45:00 AM

Work Order ID: 67434

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 3/21/2011 **Required Date:** 3/25/2011

Start Qty: 1.00 **Required Qty:** 1.00

MS21920-30	Purchased	No		230	Each	98.0000	2	2

clamp(per MIL-DTL-8783C)

Location	Loc Qty	Loc Code
LG050	48	
109181	36	
112772	12	
LG051	50	
111258	50	

AN6-40A	Purchased	No		250	Each	75.0000	4	4

Bolt

Location	Loc Qty	Loc Code
ST343	75	
112828	1	
115300	34	
115905	20	
116549	20	

AN6-41A	Purchased	No		250	Each	36.0000	2	2

Bolt

Location	Loc Qty	Loc Code
ST344	36	
113288	6	
115316	30	

AN960JD616 NAS1149D0663J	Purchased	No		250	Each	0.0000	18	18

Washer

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

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NOTE: Date & initial all entries

Work Order ID: 67434

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 3/21/2011 **Required Date:** 3/25/2011

Start Qty: 1.00 **Required Qty:** 1.00

MS21042L6	Purchased	No	250	Each	207.0000	6

Nut

6 11/4/4

Location	Loc Qty	Loc Code	
ST300	207		
111578	4		
116102	3		
116373	100		3
116548	100		3

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

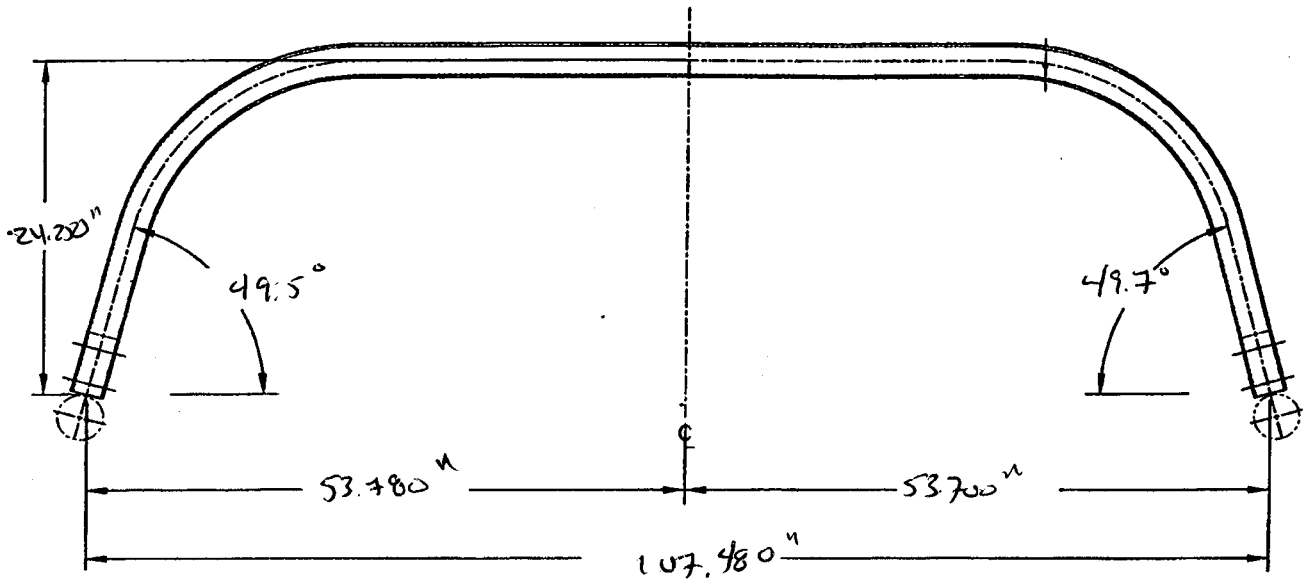
Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	6748Y
Description: Crosstube High Aft (412)	Part Number:	D412-664-203
Inspection Dwg: D412-664-243 **Rev:** E		Page 1 of 1

Required Dimension	Min	Max
Height	24.24	24.50
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.70



Comments

QC15 Inspection	
Date	11/08/07

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.08	Dimensions updated per Dwg rev. D	KJ/JLM	
C	10.02.02	Dwg Rev updated	KJ	

Item	Qty -243	Part Number	Description
1	X	**D412-664-243**	**CROSSTUBE ASSEMBLY (412 HIGH AFT)**
2	1	D6009-129	CROSSTUBE
3	2	D3595-063-570	RUBBER CUSHION
4	1	D2896-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
6	2	D2856-600-1009	ABRASION STRIP
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

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ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 274134
RF 11-03-21

RELEASED
2009 -10- 29

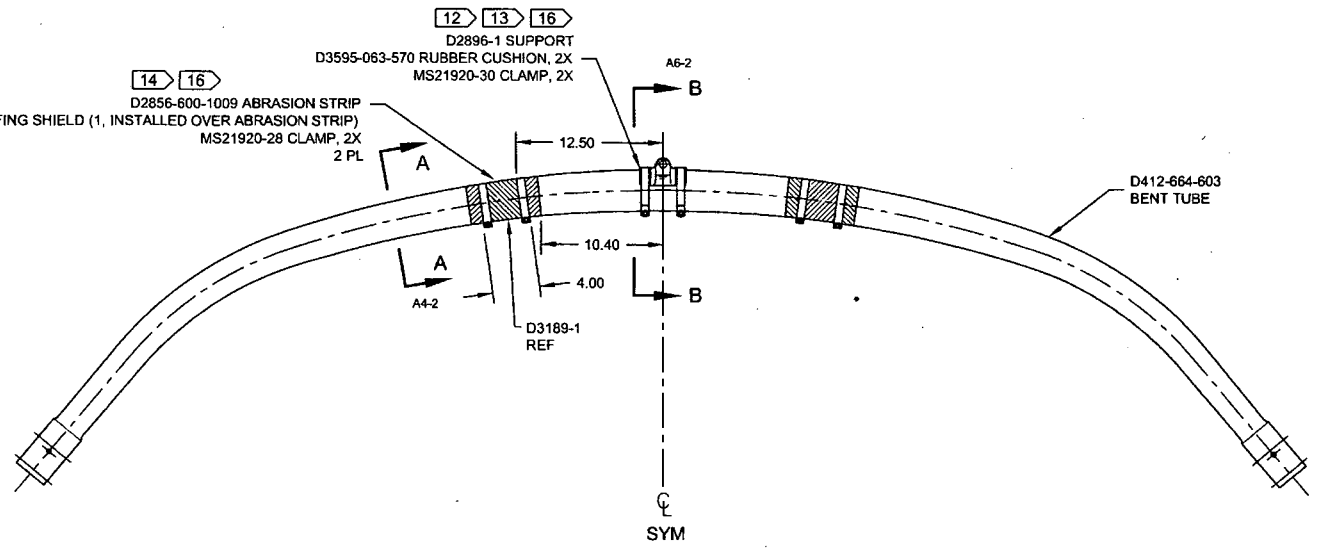
GENERAL NOTES:

1) MATERIAL: MANUFACTURED FROM D6009-129
 FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING/TRIMMING)
2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 PAINT OUTSIDE PER DART QSI 005 4.2
3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
4) UNITS: INCHES UNLESS OTHERWISE NOTED.
5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
6) IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-243" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
7) WEIGHT: 47.0 lbs (PER IIN-D212-664)
8) PART IS SYMMETRIC ABOUT CENTERLINE.
9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALY, TRANSITION SHOULD BE SMOOTH.
10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
13) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
15) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

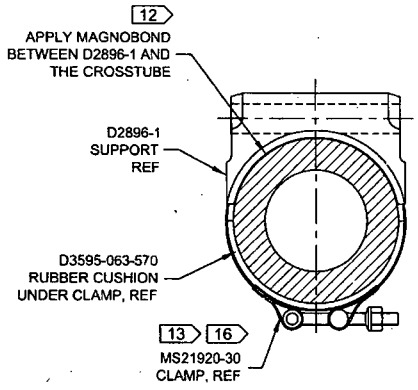
REV.	DESCRIPTION	BY	DATE
E	REFORMAT/REVISE GENERAL NOTES; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); ADD TOLERANCE (ZN B6-3, C4-3, C8-3 & C5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	09.09.30
D	REMOVE D2732-058, CHANGE TO D3595-063-570	PH	07.03.09
C	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398, MS21920-32 WAS MS21920-30	MB	06.10.27
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	01.10.17

DESIGN	PH	**DART AEROSPACE LTD**	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. E
MFG. APPR.		D412-664-243	SHEET 1 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30		

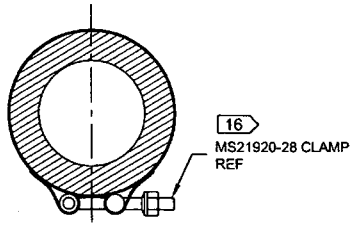
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D212-664-243
ASSEMBLY DETAIL E



SECTION B-B D4-2
SCALE 4X



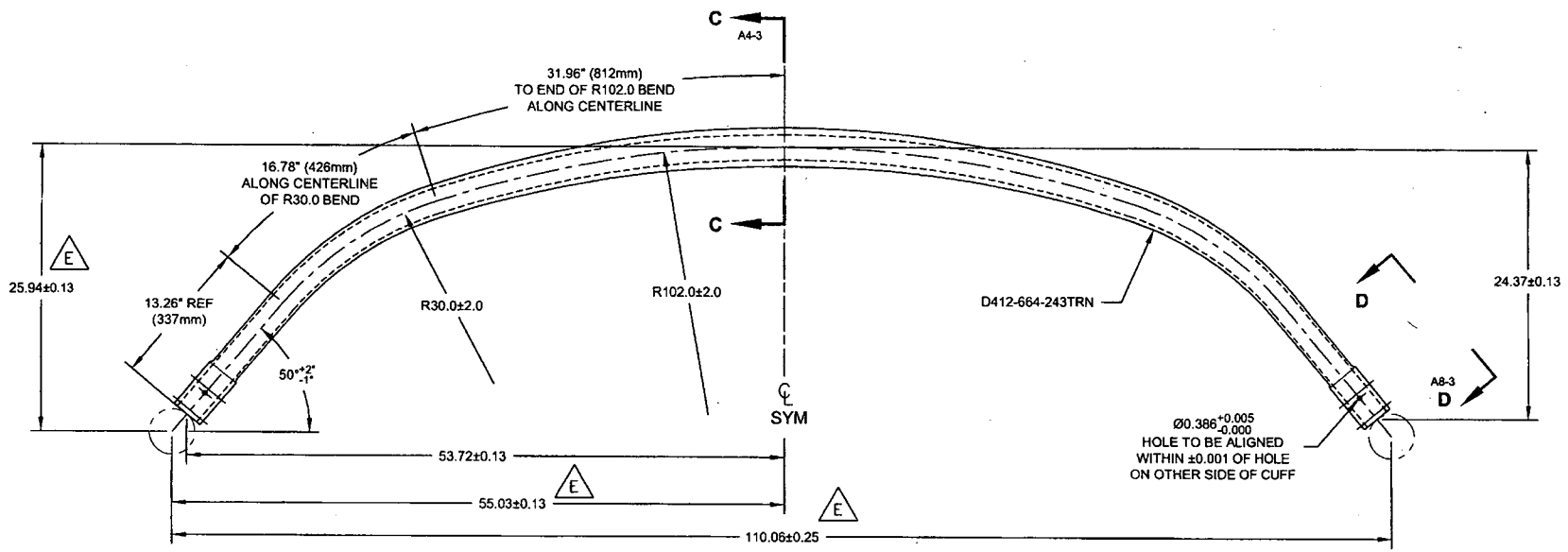
SECTION A-A C6-2
SCALE 4X

no 024434

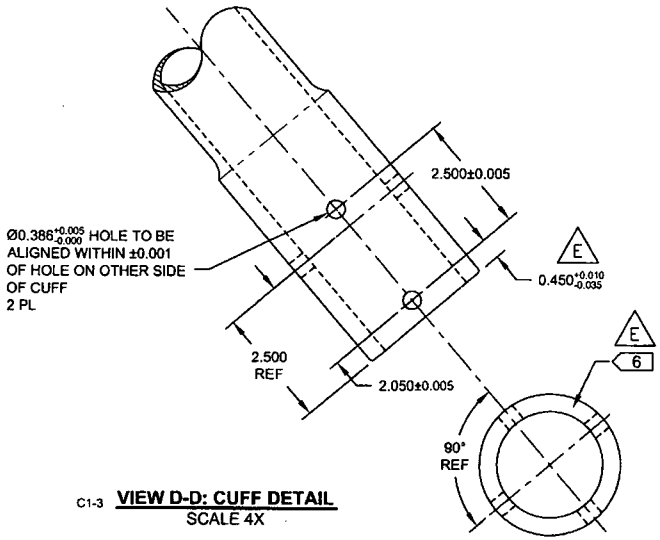
RELEASED
2009 -10- 29

DESIGN	AH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. E
MFG. APPR.		D412-664-243	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30		

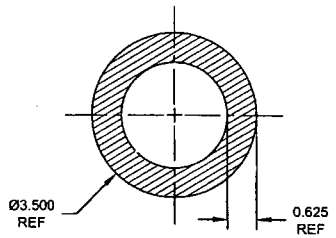
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D412-664-603 10
BENDING AND DRILLING DETAIL E



C1-3 **VIEW D-D: CUFF DETAIL**
SCALE 4X



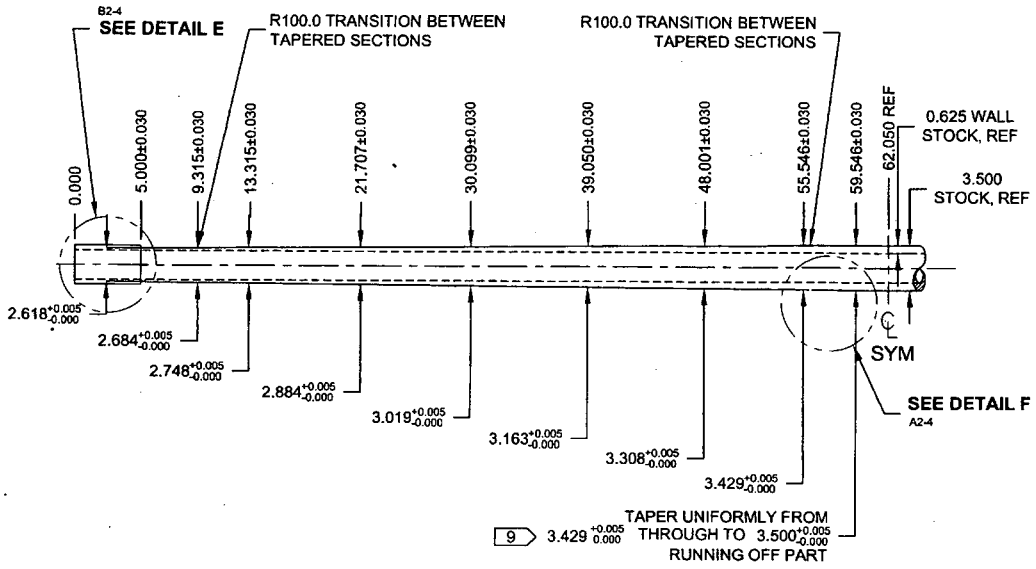
SECTION C-C D5-3
SCALE 4X

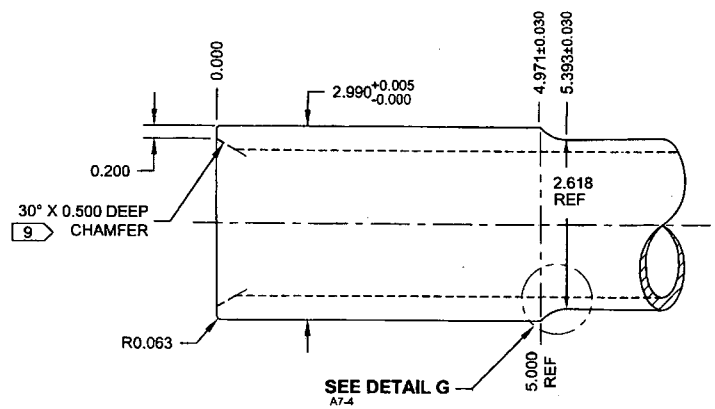
W/O 21434

RELEASED
2009 -10- 29
MP

DESIGN	AH	**DART AEROSPACE LTD**	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. E
MFG. APPR.		D412-664-243	SHEET 3 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30		

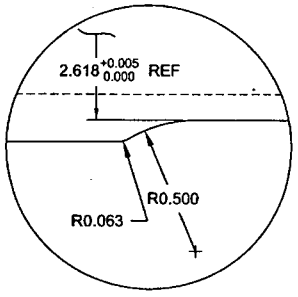
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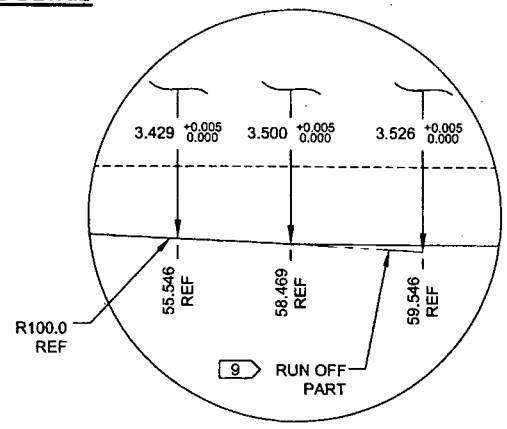


DETAIL E:
CROSSTUBE CUFF D8-4
SCALE 5X

D412-664-243TRN TURNING DETAIL (E)



DETAIL G:
CUFF TRANSITION C2-4
SCALE 10X



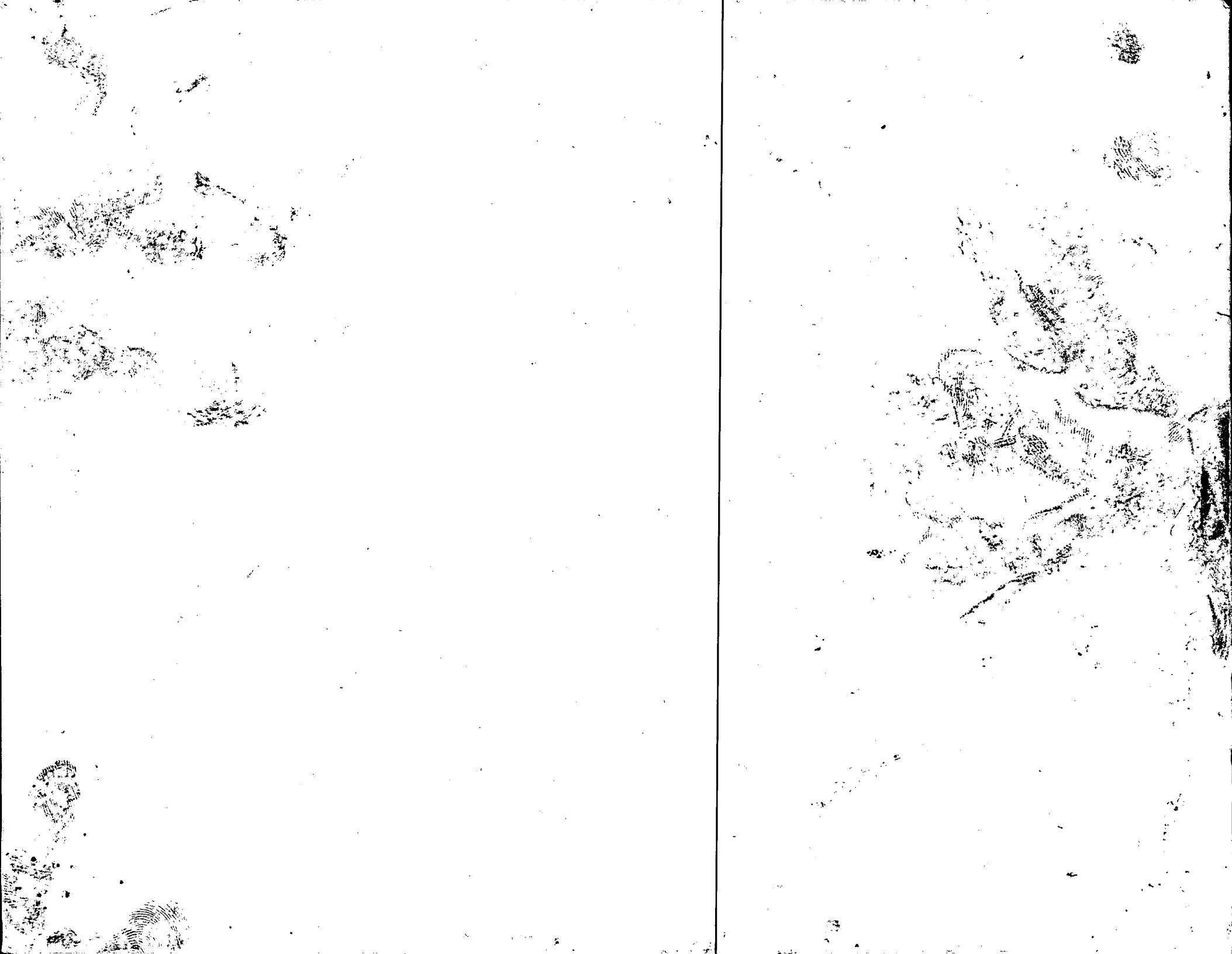
DETAIL F:
TAPER RUN-OFF C4-4
NOT TO SCALE

w/o 21434

RELEASED
2009 -10- 29

DESIGN		DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. E
MFG. APPR.		D412-664-243	SHEET 4 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30		

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P- 12234

LIQUID PENETRANT TEST REPORT

ACUREN

PAGE 1 OF 1

CLIENT: DAT AEROSPACE
ATTENTION: LINDA LACELLE
ADDRESS: 1270 ABERDEEN ST. HAWKESBURY ON. K6A 1K7
PROJECT: F.P.I. on CROSS TUBES & SLEEVES
ITEM(S) EXAMINED: (6) (8)

DATE: MARCH 30-2011 TIME: AM ☑ PM ☐
ACUREN JOB NO.: 188-11-02067
PO/WO NO.: 13743
WORK LOCATION: HAWKESBURY
ACCEPTANCE STD.: ASTM 1417/051-038 REV./DATE: 2005

JOB DESCRIPTION

PROCEDURE NO. LT-002 REV./DATE 2005 | TECHNIQUE NO. LT-TECH 2 REV./DATE 2008

PART NO.: —
MATERIAL: ALUMINUM ALUMINUM THICKNESS: VARIOUS.
SCOPE: WET FLUORESCENT LIQUID PENETRANT INSPECTION CARRIED OUT ON 100% EXTERNAL SURFACE.

TEST DETAILS

METHOD	☑ FLUORESCENT ☐ VISIBLE			☑ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED	
FAMILY BRAND	MAGNAFLUX			BLACK LIGHT S/N 16459 ☑ OUTPUT > 1000 µ W/CM² ☐ AMBIENT < 2 fc	
PENETRANT	ZL67	MINIMUM DWELL TIME	45 10 MIN.	LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT>100 fc @ SURFACE	
PENETRANT REMOVER	H2O	MINIMUM DRY TIME	>10 MIN.	OTHER LADINO	
DEVELOPER	SKD-S2	MINIMUM DWELL TIME	10 MIN.	LIGHT METER S/N 1098866	CAL DUE DATE OCT 19 2011
DEVELOPER TYPE	☑ NON AQUEOUS ☐ AQUEOUS	☐ DRY			

TEST SURFACE

SURFACE CONDITION	☐ AS GROUND	☐ AS WELDED	☐ MACHINED	☐ SHOT BLASTED	☑ CLEAN BARE METAL
SURFACE TEMPERATURE	☐ < - 4°C/ 20°F	☐ - 4°C/ 20°F TO 10°C/50°F		☑ 10°C/50°F TO 52°C/125°F	☐ > 52°C/125°F

RESULTS- (☐ METRIC ☑ IMPERIAL)

1 CROSS TUBE W.O. 67235 ✓
1 CROSS TUBE W.O. 67236 ✓
1 CROSS TUBE W.O. 67433 ✓
8 SLEEVE: W.O. 65346 ✓
1 CROSS TUBE W.O. 67435 [redacted] ✓
1 CROSS TUBE W.O. 67437 [redacted] ✓
1 CROSS TUBE W.O. 67434 ✓

PREVIOUS INDICATIONS FROM MARCH 30-2011 → REPORT # P 12233 ON THESE CROSS TUBES HAVE BEEN REMOVED

AT 11-03-30

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.
Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE: Lana Titley (PRINT) _____ (SIGNATURE)
TECHNICIAN (SIGNATURE): _____
NAME (PRINT): MIKE JOHNSTON (1ST TECHNICIAN) _____ (2ND TECHNICIAN)
CGSB LEVEL II SNT LEVEL _____ CGSB LEVEL _____ SNT LEVEL _____
CGSB REG. NO 6606 CGSB REG. NO _____

DTR # E-63782
REPORT REVIEWED BY:
NAME INITIALS

WHITE – CLIENT COPY CANARY – OFFICE COPY PINK – TECHNICIAN COPY GOLD – OFFICE COPY

Mike Petsche

From: dshepherd@dartaero.com
Sent: March 31, 2011 8:41 AM
To: Mike Petsche
Subject: Re: DSI for chafing shields

I am in favor of this change ... There is an email stuck in my outbox about it.

David

Sent from my BlackBerry device on the Rogers Wireless Network

From: "Mike Petsche" <mpetsche@dartaero.com>
Date: Thu, 31 Mar 2011 08:23:53 -0400
To: <mbellavance@dartaero.com>; 'David Shepherd'<dshepherd@dartaero.com>
Subject: DSI for chafing shields

David,

Bill mentioned that Falcon wasn't too keen on the abrasion strip under the chafing shield on the 412 crosstube. Apparently the use of Pro-seal was discussed in the telecon yesterday?

Bill would like it if we could ship the replacement crosstubes with this change already done. Marc can throw together a DSI. But before he does, fundamentally, are you in favour of this change?

MIKE PETSCHE
DART AEROSPACE
DESIGN MANAGER

613-632-5200
514-833-1657

REFERENCE ONLY

5.0 PARTS LIST

5.1 HIGH GEAR CROSSTUBES

Item	-101	-201	-203	Part Number	Description
	X			D212-664-101	**CROSSTUBE INSTALLATION, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH FWD**
		X		D212-664-201	**CROSSTUBE INSTALLATION, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH AFT**
			X	D412-664-203	**CROSSTUBE INSTALLATION, 412 HIGH AFT**
1	1			D212-664-141	CROSSTUBE ASSEMBLY, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH FWD
2		1		D212-664-241	CROSSTUBE ASSEMBLY, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH AFT
3			1	D412-664-243	CROSSTUBE ASSEMBLY, 412 HIGH AFT
10	2			* D2893-1	SUPPORT
11	4			* D3595-063-450	RUBBER CUSHION
12	4			* MS21920-25	CLAMP (OR MS21042-26)
13	4			AN6-35A	BOLT
14	4			AN6-36A	BOLT
15	6			MS21042L6	NUT (OR MS21042-6)
16	18			AN960JD616	WASHER
20		2		* D2940-1	SUPPORT
21		4		* D3595-063-530	RUBBER CUSHION
22		4		* MS21920-28	CLAMP (OR MS21042-30)
23		4		AN6-40A	BOLT
24		2		AN6-41A	BOLT
25		6		MS21042L6	NUT (OR MS21042-6)
26		18		AN960JD616	WASHER
30			1	* D2896-1	SUPPORT
31			2	* D2856-600-1009	ABRASION STRIP
32			2	* D3595-063-570	RUBBER CUSHION
33			4	* MS21920-28	CLAMP
34			2	* MS21920-30	CLAMP (OR MS21042-32)
35			4	AN6-40A	BOLT
36			2	AN6-41A	BOLT
37			6	MS21042L6	NUT (OR MS21042-6)
38			18	AN960JD616	WASHER
39			2	* D3189-1	CHAFING SHIELD
50	1	1		D3428-1	PLACARD

*REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-141/-241 OR D412-664-243 ASSEMBLIES ABOVE

NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AA SKIDTUBES.

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